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ABSTRACT

This is one of a series of units for environmental education developed by the Highline Public Schools. The lessons in this unit are designed to help students discover causes, effects, and results of air pollution through involvement in various activities; it is recommended for intermediate grade elementary school pupils. The unit can be used independently, but it is recommended for use with or following the unit entitled "It's All in the Air." The materials were tried and evaluated; evaluation data may be obtained from the Highline Public Schools. (RH)

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WRIGHT PAK

...ABOUT THIS PROBLEM OF AIR POLLUTION...

by Jan Wright

An Environmental Learning Experience which helps students discover causes and effects of air pollution through involvement in activities. One of many "ELE PAKS" available for all areas.

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SE 021 465

NATURE KNOWS BEST

PROJECT ECOLOGY TITLE III

The Kids Who Participated in the Pilot Evaluation Program

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Joseph Cameron
Brian Church
Julie Cote
Lynn Doll
James Falter
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Evaluation Results Regarding This ELE May Be Obtained by Including This Page and a Self Addressed Stamped Envelope to

Highline Public Schools, District 401
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Project ECOLogy ESEA Title III
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EVERYTHING IS CONNECTED TO EVERYTHING ELSE

PROJECT ECOLOGY

EVERYTHING MUST GO SOMEWHERE

PROJECT ECOLOGY TITLE III

THERE IS NO SUCH THING AS A FREE LUNCH

PROJECT ECOLOGY TITLE III

NOTES TO THE TEACHER

The lessons in this Environmental Learning Experience are designed to help students discover causes, effects and results of air pollution through involvement in various activities. It is hoped that these lessons will increase student appreciation of the complexity of air pollution problems and of the work of individuals and groups towards the solution of these problems.

This Environmental Learning Experience can be used independently but will be most effective if used with or following the ELE PAK entitled, "It's All In The Air".

MASTER MATERIALS LIST

Power's Micro-Ringleman Smoke Chart (available through McGraw-Hill Publishing Co.
330 West 42nd Street
New York, New York 10036)

3 copies - Career Education in the Environment by Olympia Research Corp.
(available through the Superintendent of Documents
U. S. Government Printing Office
Washington, D.C. 20402)

magazines which can be cut up

All other materials needed for the activities are easily available in the classroom or will be brought in by the students.

Journals, bulletins and additional resources available from the Project ECOLogy office.

Conservation Report
The Environmental Action Bulletin
Environment Magazine
National & International Wildlife

OTHER RESOURCE TITLES

No Laughing Matter - H.E.W.
What You Can do About Air Pollution - Puget Sound Air Pollution Control Agency
Agency Activity Reports - Puget Sound Air Pollution Control Agency
Country Beautiful - National Air Pollution Control Administration
Air Pollution Primer - T. B. Association
Take 3 Giant Steps to Clean Air - H.E.W.
Citizen Role in Implementation of Clean Air Standards - Env. Protection Agency
Citizens Guide to Clean Air - Conservation Foundation

CONCEPTUAL OVERVIEW

The development of an understanding about air pollution - its causes, effects and possible solutions.

The many sides to an air pollution problem.

LESSON 1

CONCEPT: The development of an understanding about air pollution - its causes, effects and possible solutions.

MATERIALS:

1 Power's Micro Ringleman Smoke Chart (available through McGraw-Hill Publishing Company, 330 West 42nd Street, New York, New York 10036)

3 copies Career Education in the Environment by Olympus Research Corporation (available through the Superintendent of Documents, U. S. Government Printing Office, Washington D. C. 20402

Magazines which can be cut up

All other materials needed for the activities are available in the classroom or will be brought in by students.

PROCEDURE: The activity cards for this lesson are designed to be used by either individuals or small groups of students. The cards may be used independently or as a follow-up and/or culminating activity to the study of air pollution.

The activities vary in length and design. The lesson is designed to be used for at least two weeks - 1/2 to 3/4 hour per day. Individuals or groups completing activities requiring a shorter time period may do more than one.

One way to begin using the activity cards is to discuss the content of each card with the entire class. Explain to students that they may work either individually or in small groups. Allow a few minutes for thought, discussion, and decision. Record the choice of activity for each student. Give student the activity card of his choice. The following day students will begin working.

You may wish to arrange a display of the completed air pollution projects and invite parents and/or other classes in to view them.

A. Make an air pollution table display for your classroom or for the entire school. You might include the following:

+ books about air (fiction, non-fiction, poetry)
+ magazine and newspaper articles about air pollution
+ pamphlets and brochures about air pollution
+ nylon stockings
+ a ragweed specimen
+ one Power's Micro Ringleman Smoke Chart
+ gauze nose-and-mouth mask
+ a gas mask
+ a candle
+ toy models of cars, trucks, buses, ships and planes
+ empty cigarette package
+ an insecticide spray gun
+ a piece of dyed fabric
+ a small microscope and prepared slides of pollen, ash, dust, etc.
+ a plastic bag containing dust from a vacuum cleaner bag

Give your display a title

Be prepared to answer questions about the items in your display and the relationship of each to air pollution.

B. Cover a bulletin board with white background paper. Make a caption "What Can I Do For My Planet?" Encourage each of your classmates to contribute at least one suggestion. Add each suggestion to the bulletin board.

C. Collect, mount on tagboard or construction paper and place in a folder: as many pictures as you can which relate to air pollution. Include smog-filled city scenes, factories spewing smoke and chemicals, people smoking, coughing, sneezing or rubbing their eyes, traffic jams, automobile ads, gasoline ads, a bonfire, an incinerator, a volcano, lightning, arid land, a jet and/or jet trails, a forest fire, a burning dump, house painters, window washers, laundry hanging on a clothesline, etc.

   Share your collection with your teacher and classmates.

D. Read the newspaper every day for a two or four week period. (longer if you wish) Cut out and mount in a notebook all the articles relating to air pollution. Briefly summarize each article in your own words. Display your notebook in the classroom.

E. Make a notebook about air pollution. Include information under each of the following sections:

+ Types of Air Pollutants
+ Sources of Air Pollution
+ Effects of Air Pollution on Animals
+ Effects of Air Pollution on Plants
+ Effects of Air Pollution on Human Beings
+ Cost of Air Pollution
+ Extent of Air Pollution in Our Own Community
+ Programs to Improve the Quality of Air
+ How Individuals Can Help to Solve the Problem of Air Pollution

Your teacher and librarian will help you locate research materials. Pictures should also be included. Share your completed notebook with the class.

F. Draw a series of cartoons emphasizing the air pollution problem. Display them in your classroom.

G. Invite a doctor, nurse, or a person from your local health department to visit your classroom and present a lesson on the influences of air pollution on human health. Ask them to bring X-rays of damage to different parts of the human body resulting from pollution if they have them available. (X-rays may be shown on the overhead).

Be sure to check with your teacher before issuing the invitation.

H. Write a song about air pollution. Teach it to the class.

I. Make an air poliution poster. Pictures can be drawn, cut from construction paper or cut from magazines. Display it in the classroom or in the school hallway.

J. Write and present a puppet show around the theme, "What We Can Do to Help Solve the Problem of Air Pollution". Present the puppet show to various classes in your school.

K. Write and present a panel show discussing career opportunities in the field of air pollution. Include ones such as:

+ Monitor or Inspector
    a. Environmental
    b. Food and Drug
    c. Health
    d. Nuclear
+ Technician
    a. Biological
    b. Environmental
    c. Food
    d. Health
    e. Horticultural
    f. Nuclear
+ Testers or Analysts
    a. Environmental
+ Teacher
+ Engineer
+ Mathematician

You will want to ask several classmates to work with you.

L. Play the game, "What Am I?" These are the rules:

1. Ask your teacher for permission to play the game.

2. Divide players into two teams.

3. Attach a piece of paper with the name of an air pollutant on it to the back of each player. (You may need to do some research in order to find names of air pollutants).

4. Players will move about the room asking whoever will listen, such questions as, "What color am I?" "How did I get where I am?" You may ask only one question of each person.

5. When you correctly guess what you are, for example, "I'm a hydrocarbon", you may place your card in front of you.

6. Continue to play the game until all players have identified themselves.

7. The first team with all its players identified is the winner.

M. Make anti-air pollution buttons to distribute among your friends. You make up the slogan.

N. Invite a representative from the Puget Sound Air Pollution Council to visit your classroom and explain the work done by the council. Be sure to check with your teacher before issuing the invitation.

Prepare questions before the scheduled visit. Include questions about air pollution, special air pollution problems in the Puget Sound Region and what is being done to solve them, and career opportunities in the field of air pollution.

Write thank you letters after the visit.

O. Use a nursery rhyme and write a modern version with an air pollution theme. Illustrate it. Display it in the hall or classroom. You may want to do more than one.

Example:

Old Mother Hubbard
Went to the window
To get herself a breath of fresh air -
But when she got there
She was quite in despair
She'd forgotten clean air was so rare!

P. Write a story describing your city, state, country or planet in twenty years if nothing was done about the problem of air pollution.

Share your story with your class.

LESSON 2

CONCEPT: The many sides to an air pollution problem.

MATERIAL: 4" x 6" index cards

PROCEDURE: One way to use these Problem Cards is to involve the students in a role-playing situation.

1. Discuss with class how to role-play a situation. You may want to have a group of students demonstrate the role-playing technique.

2. Divide class into groups, usually about 6 per group. Each student assumes the role of one of the people involved on each problem card.

3. Give each group a procedure card and a problem card. Allow time for the group to read and briefly discuss their problem.

4. Thoroughly discuss each step of the procedure, making certain that each group understands the instructions.

5. Allow time for each group to solve its problem and to decide on a method for presenting the solution to the class. (Time allotment will vary depending on the type of problems used, background of students and amount of research involved.) It is important that each member of the group be involved in the solution and presentation.

6. Each group presents the solution to its problem.

7. After each group has presented its solution, allow time for the entire class to discuss alternative solutions to the problem. (It is sometimes desirable to give each group the same problem and discuss the variety of solutions presented.)

8. You may want to tape-record the presentation of each group.

If you wish to make simulation activities more challenging to students, try awarding points to factual data gathered to support their point of view.

Here are some examples:

1.	Newspaper, magazine article	10 points
2.	Recorded telephone conversation	10 points
3.	Actual data gathering in field	20 points
4.	Hearsay evidence	1 point
5.	Reported information proven false	-3 points
6.	Radio - TV reports written	5 points
7.	Personal opinion	1 point

You may want to establish your own point system or add other sources. The team that can gather the most information from reliable sources and accumulate the most points will be declared the winner.

The amount of time spent on a project such as this could last several weeks, especially if the teacher allows students to gather their data.

PROBLEM CARD

PROBLEM: A large new electrical power plant is being constructed which will help to ease the current power shortage. Officials have warned, however, that the level of air pollution will increase.

PEOPLE INVOLVED:

county air pollution chairman

housewife

student

owner of a manufacturing firm

power plant operator

industrial real estate agent

PROCEDURE CARD

1. Consider the problem. If necessary, do additional research. Discuss.

2. How does the problem affect your:
   a. Job
   b. Income
   c. Housing or home
   d. Family
   e. Expenses
   f. Recreation and/or Entertainment
   g. Neighborhood
   h. Community
   i. Other

3. As a group, try to reach a solution or possible solutions to the problem.

4. Decide on a possible course of action as an individual.

PROBLEM CARD

PROBLEM: The City Council has been asked to grant a building permit allowing the construction of a large fertilizer plant in the community.

PEOPLE INVOLVED:

councilman	banker
unemployed worker	grocery clerk
truck farmer	engineer

PROCEDURE CARD

1. Consider the problem. If necessary, do additional research. Discuss.

2. How does the problem affect your:
   a. Job
   b. Income
   c. Housing or home
   d. Family
   e. Expenses
   f. Recreation and/or Entertainment
   g. Neighborhood
   h. Community
   i. Other

3. As a group, try to reach a solution or possible solutions to the problem.

4. Decide on a possible course of action as an individual.

PROBLEM CARD

PROBLEM: A farmer uses a new untested insecticide. High winds carry this pollutant throughout the community.

PEOPLE INVOLVED:

Farmer	Housewife	Doctor
Teacher	Truck driver	Editor of local paper

PROCEDURE CARD

1. Consider the problem. If necessary, do additional research. Discuss.
2. How does the problem affect your:
   a. Job
   b. Income
   c. Housing or home
   d. Family
   e. Expenses
   f. Recreation and/or Entertainment
   g. Neighborhood
   h. Community
   i. Other
3. As a group, try to reach a solution or possible solutions to the problem.
4. Decide on a possible course of action as an individual.

PROBLEM CARD

PROBLEM: Trees, shrubs and flowers on neighborhood property are dying from the constant collection of dust from the chemical plant. The paint on the houses is chipping and the value of property is dropping.

PEOPLE INVOLVED:

Engineer

Greenhouse operator

Employee of chemical plant

Superintendent of schools

Housewife

Owner of hardware store

PROCEDURE CARD

1. Consider the problem. If necessary, do additional research. Discuss.

2. How does the problem affect your:
   a. Job
   b. Income
   c. Housing or home
   d. Family
   e. Expenses
   f. Recreation and/or Entertainment
   g. Neighborhood
   h. Community
   i. Other

3. As a group, try to reach a solution or possible solutions to the problem.

4. Decide on a possible course of action as an individual.

PROBLEM CARD

PROBLEM: A new airline contract has been approved. The additional landings and takeoffs per day add to air and noise pollution.

PEOPLE INVOLVED:

Airport manager	Pilot	Policeman
Taxi-cab driver	Student	Secretary
Airline passenger		

PROCEDURE CARD

1. Consider the problem. If necessary, do additional research. Discuss.

2. How does the problem affect your:
   a. Job
   b. Income
   c. Housing or home
   d. Family
   e. Expenses
   f. Recreation and/or Entertainment
   g. Neighborhood
   h. Community
   i. Other

3. As a group, try to reach a solution or possible solutions to the problem.

4. Decide on a possible course of action as an individual.

PROBLEM CARD

PROBLEM: Dr. George Hastings, a dentist, lives close to the main flight path near the airport. Increasing air traffic and resulting noise and falling fuel wastes are causing his children to lose sleep, his wife to face a possible nervous breakdown, and the plants around his house to die.

SUGGESTED CHARACTERS:

Dentist	Judge	Airport manager
His wife	Reporter	Real estate broker

PROCEDURE CARD

1. Consider the problem. If necessary, do additional research. Discuss.

2. How does the problem affect your:
   a. Job
   b. Income
   c. Housing or home
   d. Family
   e. Expenses
   f. Recreation and/or Entertainment
   g. Neighborhood
   h. Community
   i. Other

3. As a group, try to reach a solution or possible solutions to the problem.

4. Decide on a possible course of action as an individual.

PROBLEM CARD

PROBLEM: The entire spinach crop in your area has been lost because of air pollution and chemical fallout.

OCCUPATIONS:

Truck farmer

Housewife

Welfare recipient

College chemistry instructor

Welder

Baseball player

PROCEDURE CARD

1. Consider the problem. If necessary, do additional research. Discuss.

2. How does the problem affect your:
   a. Job
   b. Income
   c. Housing or home
   d. Family
   e. Expenses
   f. Recreation and/or Entertainment
   g. Neighborhood
   h. Community
   i. Other

3. As a group, try to reach a solution or possible solutions to the problem.

4. Decide on a possible course of action as an individual.

PROBLEM CARD

PROBLEM: You are a greenhouse owner and you have lost your entire carnation crop because of air pollution and chemical fallout.

PEOPLE INVOLVED:

Greenhouse owner	County chemist on fallout
County air pollution chairman	Horticulturist from the university
Representative from florists' association	Legal adviser for greenhouse owner

PROCEDURE CARD

1. Consider the problem. If necessary, do additional research. Discuss.

2. How does the problem affect your:
   a. Job
   b. Income
   c. Housing or home
   d. Family
   e. Expenses
   f. Recreation and/or Entertainment
   g. Neighborhood
   h. Community
   i. Other

3. As a group, try to reach a solution or possible solutions to the problem.

4. Decide on a possible course of action as an individual.